

## Claims

We claim:

1. An NPN transistor formed in a semiconductor substrate, said substrate being doped with P-type impurity and not comprising an epitaxial layer, said transistor comprising:
  - an N-type isolation region extending downward from a surface of said substrate, said N-type isolation region comprising a deep N layer and an annular N well, said N-type isolation region enclosing an isolated P region of said P-type substrate, said N-type isolation region also forming a collector of said transistor, said isolated P region forming a base of said transistor;
  - wherein said N well comprises a retrograde doping profile;
  - an N-type region located at said surface of said substrate within said isolated P region, said N-type region forming an emitter of said transistor;
  - a shallow P-type region within said isolated P region to facilitate electrical contact to said base of said transistor, said shallow P-type region having a doping concentration higher than said substrate, and
  - electrical contacts to said emitter, said base and said collector in order to facilitate electrical biasing of said NPN transistor.
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